What is claimed is:

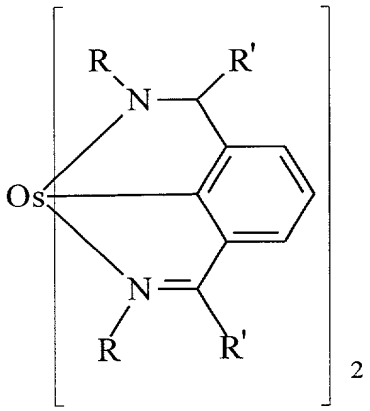
1. An emissive layer of an organic light emitting device comprising a phosphorescent organometallic compound for enhancing the quantum efficiency of the organic light emitting device.

2. An emissive layer of an organic light emitting device comprising a phosphorescent organometallic compound for enhancing the quantum efficiency of the organic light emitting device, wherein the phosphorescent organometallic compound is selected from the group consisting of iridium and osmium compounds.

3. The emissive layer of claim 2 wherein the phosphorescent organometallic compound is an osmium compound.

4. The emissive layer of claim 3 further comprising a host material for the osmium compound.

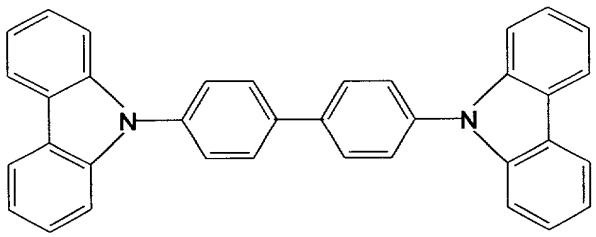
5. The emissive layer of claim 4 wherein the osmium compound is denoted by the formula:



6. The emissive layer of claim 4 wherein the emissive layer is one layer of an organic light emitting device including at least an anode and a cathode, and wherein the emissive layer produces light when a voltage is applied across the anode and the cathode of the organic light emitting device.

7. The emissive layer of claim 4 wherein the host material is a hole-transporting material selected from the group consisting of substituted tri-aryl amines and polyvinylcarbazoles.

8. The emissive layer of claim 7 wherein the hole transporting material comprises 4,4'-N,N'-dicarbazole-biphenyl as denoted by the formula:



9. The emissive layer of claim 4 wherein the host material is a hole-transporting material and the hole transporting material further comprises 4,4'-bis[N-(1-naphthyl)-N-phenyl-amino] biphenyl.

10. The emissive layer of claim 4 wherein the host material is an electron transporting material.

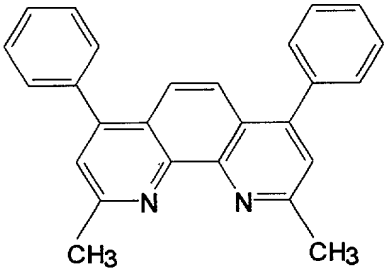
11. The emissive layer of claim 10 wherein the electron transporting material comprises tris-(8-hydroxyquinoline) aluminum.

12. The emissive layer of claim 3 further comprising a polarization dopant having

a dipole moment.

13. The emissive layer of claim 3 wherein the emissive layer is in contact with an exciton blocking layer.

14. The emissive layer of claim 13 wherein the exciton blocking layer comprises 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline as denoted by the formula:

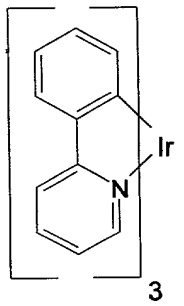


15. The emissive layer of claim 2 wherein the phosphorescent organometallic compound is an iridium compound.

16. The emissive layer of claim 15 further comprising a host material for the organometallic iridium compound.

17. The emissive layer of claim 16 wherein the iridium compound produces a green emission when a voltage is applied across the emissive layer.

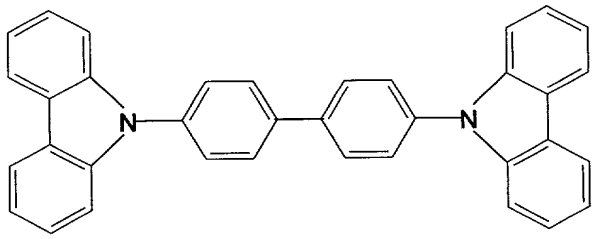
18. The emissive layer of claim 16 wherein the iridium compound is fac-tris(2-phenylpyridine) iridium, as denoted by the formula:



19. The emissive layer of claim 16 wherein the emissive layer is one layer of an organic light emitting device including at least an anode and a cathode, and wherein the emissive layer produces light when a voltage is applied across the anode and the cathode of the organic light emitting device.

20. The emissive layer of claim 16 wherein the host material is a hole-transporting material selected from the group consisting of substituted tri-aryl amines and polyvinylcarbazoles.

21. The emissive layer of claim 20 wherein the hole transporting material comprises 4,4'-N,N'-dicarbazole-biphenyl as denoted by the formula:



22. The emissive layer of claim 20 wherein the host material is a hole-transporting material and the hole transporting material further comprises

4,4'-bis[N-(1-naphthyl)-N-phenyl-amino] biphenyl.

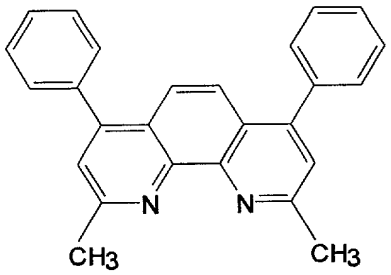
23. The emissive layer of claim 16 wherein the host material is an electron transporting material.

24. The emissive layer of claim 23 wherein the electron transporting material comprises tris-(8-hydroxyquinoline) aluminum.

25. The emissive layer of claim 16 further comprising a polarization dopant having a dipole moment.

26. The emissive layer of claim 16 wherein the emissive layer is in contact with an exciton blocking layer.

27. The emissive layer of claim 26 wherein the exciton blocking layer comprises 2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline as denoted by the formula:

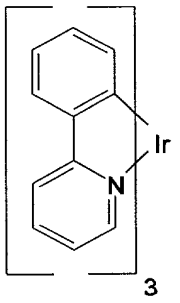


28. An organic light emitting device comprising at least an anode, a cathode and at least one emissive layer, wherein the at least one emissive layer is located between the anode and the cathode, and the emissive layer comprises a phosphorescent organometallic compound for enhancing the quantum efficiency of the organic light emitting device.

29. An organic light emitting device comprising at least an anode, a cathode and at least one emissive layer, wherein the at least one emissive layer is located between the anode and the cathode, and the emissive layer comprises a phosphorescent organometallic compound for enhancing the quantum efficiency of the organic light emitting device, wherein the phosphorescent organometallic compound is selected from the group consisting of iridium and osmium compounds.

30. The organic light emitting device of claim 29 wherein the phosphorescent organometallic compound is an iridium compound, and wherein the emissive layer further comprises a host material for the iridium compound.

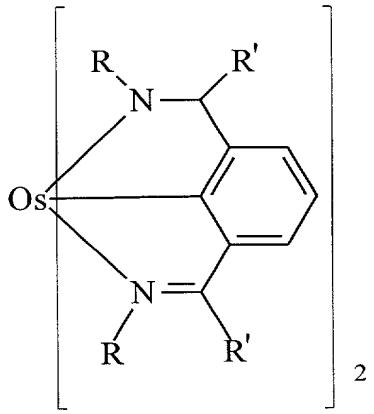
31. The organic light emitting device of claim 30 wherein the iridium compound is fac-tris(2-phenylpyridine) iridium, as denoted by the formula:



32. The organic light emitting device of claim 30 wherein the iridium compound produces a green emission when a voltage is applied across the emissive layer.

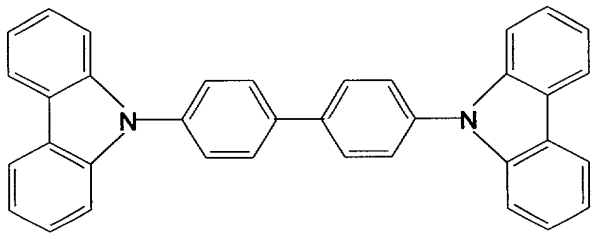
33. The organic light emitting device of claim 29 wherein the phosphorescent organometallic compound is an osmium compound, and wherein the emissive layer further comprises a host material for the osmium compound.

34. The organic light emitting device of claim 33 wherein the osmium compound is denoted by the formula:



35. The organic light emitting device of claim 34 wherein the host material is a hole-transporting material selected from the group of hole-transporting materials consisting of substituted tri-aryl amines and polyvinylcarbozoles.

36. The organic light emitting device of claim 35 wherein the hole transporting material comprises 4,4'-N,N'-dicarbazole-biphenyl as denoted by the formula:



37. The organic light emitting device of claim 30 wherein the host material is an electron transporting material.

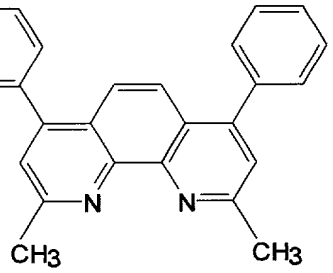
38. The organic light emitting device of claim 37 wherein the electron transporting

material comprises tris-(8-hydroxyquinoline) aluminum.

39. The organic light emitting device of claim 30 wherein the emissive layer further comprises a polarization dopant having a dipole moment.

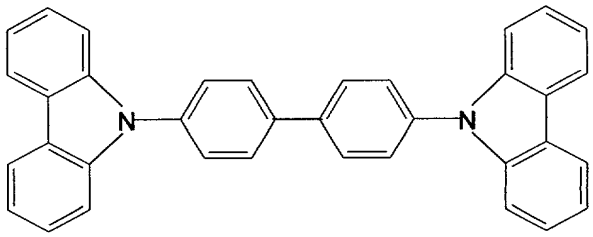
40. The organic light emitting device of claim 30 wherein the emissive layer is in contact with an exciton blocking layer.

41. The organic light emitting device of claim 40 wherein the exciton blocking layer comprises 2,9-dimethyl-1,10-phenanthroline as denoted by the formula:



42. The organic light emitting device of claim 33 wherein the host material is a hole-transporting material selected from the group of hole-transporting materials consisting of substituted tri-aryl amines and polyvinylcarbozoles.

43. The organic light emitting device of claim 42 wherein the hole transporting material comprises 4,4'-N,N'-dicarbazole-biphenyl as denoted by the formula:



44. The organic light emitting device of claim 42 wherein the hole transporting material further comprises 4,4'-bis[N-(1-naphthyl)-N-phenyl-amino] biphenyl.

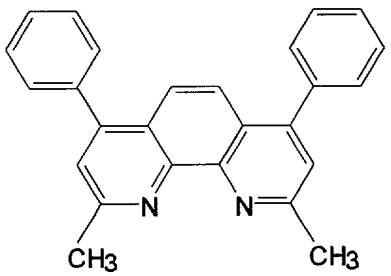
45. The organic light emitting device of claim 33 wherein the host material is an electron transporting material.

46. The organic light emitting device of claim 45 wherein the electron transporting material comprises tris-(8-hydroxyquinoline) aluminum.

47. The organic light emitting device of claim 33 wherein the emissive layer further comprises a polarization dopant having a dipole moment.

48. The organic light emitting device of claim 33 wherein the emissive layer is in contact with an exciton blocking layer.

49. The organic light emitting device of claim 48 wherein the exciton blocking layer comprises 2,9-dimethyl-1,10-phenanthroline as denoted by the formula:



50. A display device incorporating at least one of the organic light emitting device of claim 29.

51. The display device of claim 50 wherein the display device is incorporated into a system selected from the group of systems consisting of a vehicle, a computer, a television, a printer, a flush-mounted wall monitor, a billboard, a stadium screen, a theater screen, and a sign.

52. An emissive layer of an organic light emitting device comprising:
a phosphorescent organometallic compound for enhancing the quantum efficiency of the organic light emitting device; and
a host material, wherein the phosphorescent organometallic compound is present as a dopant in said host material.

53. An emissive layer of an organic light emitting device comprising:
a phosphorescent organometallic compound for enhancing the quantum efficiency of the organic light emitting device; and
a host material, wherein the phosphorescent organometallic compound is present as a dopant in said host material, and the phosphorescent organometallic compound is selected from the group consisting of phosphorescent organometallic platinum complexes.

54. An emissive layer of an organic light emitting device comprising:
a phosphorescent organometallic compound for enhancing the quantum efficiency of the organic light emitting device; and
a host material, wherein the phosphorescent organometallic compound is present as a dopant in said host material, and the phosphorescent organometallic compound is selected from the group consisting of phosphorescent cyclometallated platinum complexes.

55. The emissive layer of claim 54 wherein the phosphorescent organometallic

compound produces an emission at a wavelength between 400 nm and 700 nm.

56. The emissive layer of claim 55 wherein the emission will appear blue.

57. The emissive layer of claim 55 wherein the emission will appear green.

58. The emissive layer of claim 55 wherein the emission will appear red.

59. The emissive layer of claim 54 wherein the host material is a hole-transporting material selected from the group consisting of substituted tri-aryl amines and polyvinylcarbazoles.

60. The emissive layer of claim 54 wherein the host material is an electron-transporting material selected from the group consisting of metal quinoxolates, oxadiazoles and triazoles.

61. The emissive layer of claim 54 wherein the phosphorescent organometallic compound is selected from the group consisting of cis-Bis[2-(2-phenyl)pyridinato-N,C^2] Pt (II), cis-Bis[2-(2'-thienyl)pyridinato-N,C^3] Pt (II) and cis-Bis[benzo(h)quinolinato-N,C] Pt (II).

62. The emissive layer of claim 53 wherein the phosphorescent organometallic platinum complex is substituted with at least one of electron donors and electron acceptors.

63. The emissive layer of claim 54 wherein the phosphorescent cyclometallated platinum complex is substituted with at least one of electron donors and electron acceptors.

64. The emissive layer of claim 54 further comprising a polarization molecule, present as a second dopant in said host material and having a dipole moment.

65. The emissive layer of claim 64 wherein the polarization molecule is an aromatic molecule substituted with at least one of electron donors and electron acceptors.

66. The organic light emitting device of claim 28 wherein the at least one emissive layer further comprises a host material, wherein the phosphorescent organometallic compound is present as a dopant in said host material.

67. A display device incorporating at least one of the organic light emitting device of claim 66.

68. The display device of claim 67 wherein the display device is incorporated into a system selected from the group of systems consisting of a vehicle, a computer, a television, a printer, a flush-mounted wall monitor, a billboard, a stadium screen, a theater screen, and a sign.

69. An organic light emitting device comprising:
an emitter layer comprising a molecule of the formula L_2MX, wherein L and X are inequivalent, bidentate ligands and M is a metal which forms octahedral complexes, and wherein the emitter layer produces an emission which has a maximum at a certain wavelength λ_{max}.

70. An organic light emitting device comprising:
an emitter layer comprising a host and a dopant wherein the dopant comprises a molecule of the formula L_2MX, wherein L and X are inequivalent, bidentate ligands and M is a metal which forms octahedral complexes.

71. The device of claim 69 wherein L is selected from the group consisting of 2-((1-naphthyl)benzoxazole), (2-phenylbenzoxazole), (2-phenylbenzothiazole), (7,8-benzoquinoline), coumarin, (thienylpyridine), phenylpyridine, benzothienylpyridine, 3-methoxy-2-phenylpyridine, thienylpyridine, and

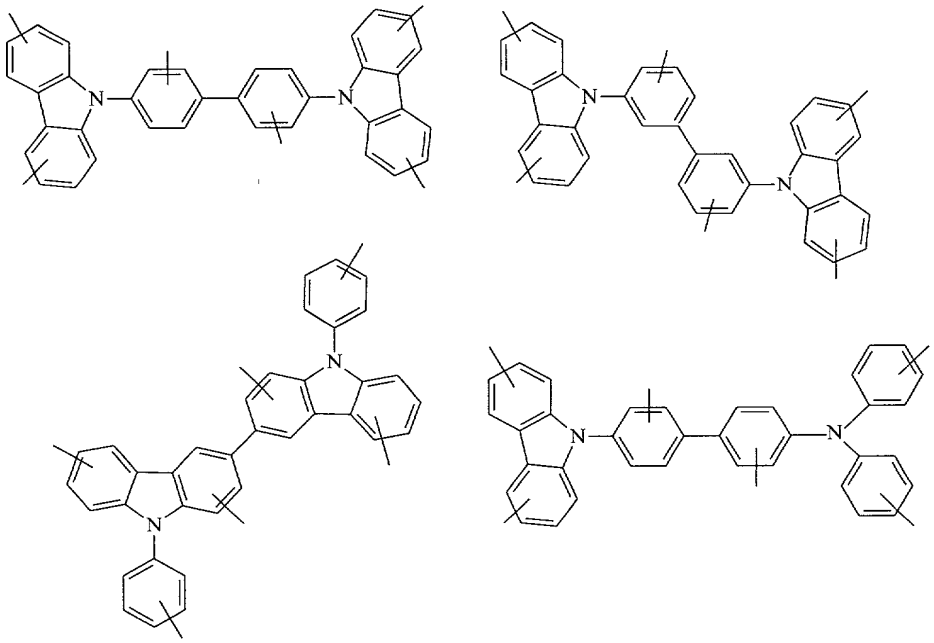
tolylpyridine; and X is selected from the group consisting of acetylacetonate ("acac"), hexafluoroacetylacetonate, salicylidene, picolinate, and 8-hydroxyquinolinate.

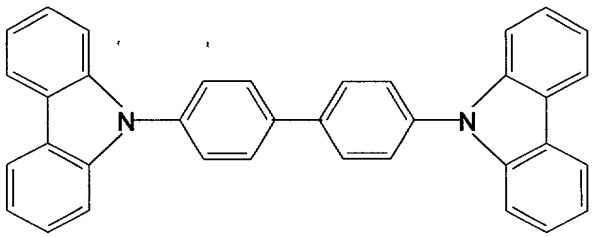
72. The device of claim 69 wherein M is iridium.

73. The device of claim 71 wherein M is iridium.

74. The device of claim 69 wherein L is fluorescent and L_2MX is phosphorescent.

75. The device of claim 70 wherein the host is selected from the group consisting of:



and  ;

wherein the notation of the line segment drawn through the aromatic ring denotes optional substitution at any carbon in that ring by alkyl or aryl.

76. An organic light emitting device comprising:
an emitter layer comprising a moiety L_2M, wherein L is a monoanionic bidentate ligand coordinated to M through an sp^2 carbon and a heteroatom, M is a metal which forms octahedral complexes, and the heteroatom of each L ligand is in a trans configuration.

77. The device of claim 69 wherein M is selected from the group consisting of osmium, iridium and platinum.

78. The device of claim 69 wherein X functions to trap electrons or holes.

79. The device of claim 69 wherein L_2MX is made from $L_2M(\mu\text{-}Cl)_2ML_2$.

80. A display device incorporating at least one of the organic light emitting device of claim 69.

81. The display device of claim 80 wherein the display device is incorporated into a system selected from the group of systems consisting of a vehicle, a computer, a television, a printer, a flush-mounted wall monitor, a billboard, a

stadium screen, a theater screen, and a sign.

82. An organic light emitting device comprising:
an emitter layer comprising a molecule of the formula LL'L"M wherein L, L' and L" are inequivalent bidentate ligands, M is a metal which forms octahedral complexes, and the molecule of the formula LL'L"M is phosphorescent.

83. An organic light emitting device comprising:
an emitter layer comprising an L_2M moiety, wherein L is a bidentate ligand containing a nitrogen atom which coordinates to M and M is a metal which forms octahedral complexes, wherein the nitrogen atoms of the two L-M bonds are in a trans configuration to one another.

84. A composition of formula LL'L"M, wherein
L, L', and L" are bidentate ligands which coordinate to M and M is a metal selected from the group consisting of the third row of the transition metal group of the periodic table which forms an octahedral complex with L, L' and L".

85. The composition of claim 84 wherein the composition electroluminesces via a phosphorescent mechanism.

86. The composition of claim 84 wherein L, L', and L" each contain a nitrogen atom which coordinates to M and the nitrogen atoms are in a meridianal arrangement.

87. The composition of claim 84 wherein L and L' are bidentate monoanionic ligands containing a nitrogen atom which coordinates to M, and L" is a bidentate monoanionic ligand.

88. The composition of claim 84 wherein L and L' are equivalent, monoanionic bidentate ligands which coordinate to M via an sp^2 hybridized carbon and a

heteroatom, and L" is a monoanionic bidentate ligand.

89. An organic light emitting device comprising:
an emitter layer comprising a moiety L_2M, wherein L is a monoanionic bidentate ligand coordinated to M through an sp^2 carbon and a heteroatom, and M is a metal which forms octahedral complexes, wherein the heteroatoms of the two L ligands are in a trans configuration.

90. A method of making a composition of the formula L_2MX, said method comprising the step of combining a bridged dimer of formula $L_2M(\mu\text{-}Cl)_2ML_2$ with a Bronsted acid XH to make an organometallic complex of formula L_2MX wherein L and X are monoanionic, bidentate ligands and M is a metal which forms octahedral complexes.